

REMARKS

Claim Amendments

Claims 145-147 have been canceled without prejudice. Claims 102, 142-144, 148-157, and 159-166 are amended by the present Preliminary Amendment. Upon entry of the Amendment, claims 102-144 and 148-166 remain pending and are presented for consideration.

Claim 102 has been amended to recite that at least one of the capsules is enclosed by a deformable membrane deformed into a non-spherical shape. Support for amendment to claim 102 can be found in the Specification, for example, at page 10, lns. 6-8, page 13, lns. 9-11, and page 14, lns. 3-6. Claim 142 has been amended to correct a typographical error (see originally filed claim 92). Claim 143 has been amended to recite that at least one of the capsules comprises at least one electrophoretic particle dispersed in at least one suspending fluid. Support for amendment to claim 143 can be found in the Specification, for example, at page 10, lns. 9-15, and page 21, lns. 18-20. Claim 144 has been amended to depend from amended claim 102. Claims 148-157 and 159-166 have been amended to depend from claim 143 with necessary formal corrections. Applicants respectfully submit that no new matter is introduced by the present Amendment.

Status of the Claims

Claims 102-166 were pending in the present Application. After then entry of the present Amendment, claims 102-144 and 148-166 remain pending.

Claims 154 and 156 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 102-105, 108-117, 119, 123-127, 132-134, 138-140, 144, 146, 148, 149, 151-157, 159, 160, and 162-165 have been rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 3,612,758 to Evans *et al.* ("Evans"). Claims 102, 103, 105, 108, 109, 111-120, 123-127, 132-138, 140, 144-149, 152-160, and 162-166 have been rejected under 35 U.S.C. § 102(e) as anticipated by United States Patent No. 5,930,026 to Jacobson *et al.* ("Jacobson I").

Claims 106, 107, 118, 122, 135, 136, 142, and 143 have been rejected under 35 U.S.C. § 103(a) as obvious in view of Evans. Claims 106, 107, 122, 141-143, and 150 have been rejected under 35 U.S.C. § 103(a) as obvious in view of Jacobson I. Claims 128-131 have been rejected under 35 U.S.C. § 103(a) as obvious in view of Jacobson I and further in view of United States Patent No. 6,480,182 to Turner *et al.* ("Turner"). Claims 121 and 161 have been rejected as obvious under 35 U.S.C. § 103(a) over Jacobson I in view of United States Patent No. 6,323,989 to Jacobson *et al.* ("Jacobson II").

1. Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 154 and 156 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Examiner points out that these claims recite materials that their respective base claims do not recite. Without acquiescing to the rejections, Applicants have amended both claims 154 and 156 such that they both depend from claim 143, obviating the rejections. Accordingly, Applicants respectfully submit that the rejections under 35 U.S.C. § 112, second paragraph, have been overcome and request their withdrawal.

2. Rejections Under 35 U.S.C. § 102

2.1 Claims 102-105, 108-117, 119, 123-127, 132-134, 138-140, 144, 146, 148, 149, 151-157, 159, 160, and 162-165 have been rejected under 35 U.S.C. § 102(b) as anticipated by Evans. After entry of the present Amendment, amended claim 102 remains the only independent claim in this group as amended claim 144 now depends from amended claim 102. Claim 146 has been canceled without prejudice. Claims 148, 149, 151-157, 159, 160, and 162-165 now depend from claim 143 and will be discussed below in section 3.1 concerning rejection of claim 143 as obvious in view of Evans.

Amended claim 102 recites an encapsulated electrophoretic element including an electrophoretic ink. The electrophoretic ink includes a plurality of non-spherical capsules dispersed in a binder, at least one of the capsules being enclosed by a deformable membrane

deformed into a non-spherical shape. The plurality of capsules form substantially a single layer when the ink is disposed on a substrate.

Evans describes an electrophoretic display with parallel conductive lines insulated from each other on a support substrate (col. 2, lns. 1-10). "Overlying each conductive line and *in contact* therewith is a layer of electrophoretic ink ..." (emphasis added) (col. 2, lns. 10-12). On top of the electrophoretic ink layer are a plurality of transparent conductors (col. 2, lns. 13-15). The display described in Evans is not encapsulated as recited in the present claim 102 as Evans' electrophoretic ink (18) fills the top portion of a trough formed by an insulating layer (13) with the conductive line (14) at the lower portion of the trough, and the ink is "in contact" with the conductive line (FIGS. 1 and 2a; col. 2, lns. 10-12; and col. 3, lns. 1-11).

The Office Action points to the "insulating layer (13)" as matching the membrane recited in present claim 102. Without acquiescing to that characterization, Applicants have amended claim 102 to further recite the present invention with more particularity. Amended claim 102 now clarifies that the membrane enclosing at least one of the capsules in the claimed display must be deformable, leading to the non-spherical shape of the capsule. Nowhere in Evans does it suggest that its insulating layer is deformable or that any of the troughs formed by the insulating layers are deformed. In fact, Evans suggests that the insulating layer is made of a tough material as it states that the "[i]nsulating material 13 is preferably selected so that it is capable of withstanding the etching agents used to form the trough." Col. 3, lns. 22-24.

Accordingly, Evans at least does not teach or suggest an encapsulated electrophoretic element, or that at least one of the capsules is enclosed by a deformable membrane deformed into a non-spherical shape, limitations recited by amended claim 102.

Amended claim 144 now depends from amended claim 102, along with claims 103-105, 108-117, 119, 123-127, 132-134, 138-140, which also depend from amended claim 102, should be novel over Evans as their base claim 102 is. For the above reasons, Applicants respectfully request the § 102 rejections based on Evans against amended claim 102 and its dependent claims, be reconsidered and withdrawn.

2.2 Claim 102, some of its dependent claims (103, 105, 108, 109, 111-120, 123-127, 132-138, and 140), and claims 144-149, 152-160, and 162-166 have been rejected as anticipated under 35 U.S.C. § 102(e) by Jacobson I. After entry of the present Amendment, amended claim 102 remains the only independent claim in this group as amended claim 144 now depends from amended claim 102. Claims 145-147 have been canceled without prejudice. Claims 148, 149, 152-160, and 162-166 now depend from claim 143 and will be discussed below in section 3.2 concerning rejection of claim 143 as obvious in view of Jacobson I.

Jacobson I describes, among other things, use of piezoelectric elements to power non-emissive displays including encapsulated electrophoretic displays (Abstract). With regard to amended claim 102, while Jacobson I says that its microcapsules “need not be strictly spherical,” it does not describe having a capsule that is non-spherical because its membrane is deformed. There are various ways of having a non-spherical capsule, and not all of them are achieved through deforming a membrane. Nor does Jacobson I provide enabling disclosure for making such a non-spherical capsule through deformation of its membrane. Accordingly, Applicants respectfully submit that Jacobson I does not teach or suggest all the limitations recited in amended claim 102.

Amended claim 144 now depends from amended claim 102, along with claims 103, 105, 108, 109, 11-120, 123-127, 132-138, and 140, which also depend from amended claim 102, should be novel over Jacobson I as their base claim 102 is. For the above reasons, Applicants respectfully request the § 102 rejections based on Jacobson I against amended claim 102 and its dependent claims, be reconsidered and withdrawn.

3. Rejections Under 35 U.S.C. § 103

3.1 Claims 106, 107, 118, 122, 135, 136, 142, and 143 have been rejected as obvious under 35 U.S.C. § 103(a) over Evans.

Claims 106, 107, 118, 122, 135, and 136 depend from amended claim 102. As detailed in section 2.1, Evans does not teach or suggest all the limitations recited in amended claim 102. Accordingly, rejections of claims 106, 107, 118, 122, 135, and 136 under § 103(a) cannot be sustained.

Amended claim 142 recites an encapsulated electrophoretic element including an electrophoretic ink. The electrophoretic ink has a plurality of non-spherical capsules dispersed in a binder comprising a binder solid, at least one of the capsules being enclosed by a membrane. The capsules form substantially a single layer when the ink is disposed on a substrate, and a ratio of a mass of the binder solid to a mass of the capsules is between about 1:2 and about 1:20.

The present application teaches the advantage of having the recited binder solid mass to capsule mass ratio:

To encourage close packing of the capsules in the monolayer film, the ratio of binder solid mass to capsule mass should be kept as low as possible. Minimizing the amount of non-optically active material (such as binder) allows for good packing and results in good contrast between the white and dark state of a display. *See, e.g.*, FIGS. 1A and 1B. However, the binder is in the film to provide structural integrity, creating a tension between desiring to reduce the amount of binder (for optical properties) and desiring to increase the amount to binder (for structural reasons). In the film, a useful ratio of binder solid mass to capsule mass is in the range of about 1:2 to about 1:20, and preferably between about 1:4 and about 1:12, and most preferably between about 1:6 and about 1:10. These metrics also apply to the polymer matrix content in a polymer-dispersed EPID.

Page 40, lines 8-17. In contrast, Evans does not allude to such a ratio. Nor does Evans mention the advantage for a display that may be associated with having the ratio as presently claimed. Accordingly, not all the limitation recited in amended claim 142 is taught or suggested in Evans, and a rejection of amended claim 142 under 35 U.S.C. § 103 over Evans cannot be sustained.

Amended claim 143 recites an encapsulated electrophoretic element including an electrophoretic ink. The electrophoretic ink has a plurality of non-spherical capsules dispersed in a binder, at least one of the capsules being enclosed by a membrane. At least one of the capsules includes at least one electrophoretic particle dispersed in at least one suspending fluid. The

capsules form substantially a single layer when the ink is disposed on a substrate, and at least a portion of the element has an optically active fraction of at least 70%.

The present application teaches that the recited optically active fraction is an advantage of having non-spherical capsules in a display:

Due to the shape of the capsules 100, 102, 104, 106, the optically active area of the capsules 100, 102, 104, 106 that is roughly coincident with the plane 110 (shown with solid lines in FIG. 6A) is slightly smaller than the total optically active area (shown with dashed lines in FIG. 6A). Thus, according to the extrapolation technique, the total optically active area, as represented by the dashed lines, is superimposed on the plane 110. FIG. 6B shows how a portion of the capsules 100, 102, 104, 106 is close to, but not coincident with, the plane 110 of the display, explaining why the solid lines and dashed lines in FIG. 6A are not coincident. In practice, useful optically active fractions are equal to or greater than about 70% and more preferably equal to or greater than about 90%.

Page 12, lines 7-16. In contrast, Evans does not even allude to the concept of optically active fraction, let alone teaching or suggesting the advantage in an electrophoretic element for having a high range of optically active fraction as recited in amended claim 143. Accordingly, not all the limitation recited in amended claim 143 is taught or suggested in Evans, and a rejection of amended claim 143 and its dependent claims (see section 2.1) under 35 U.S.C. § 103 over Evans cannot be sustained.

For the above reasons, Applicants respectfully request that the § 103 rejections based on Evans against claims 106, 107, 118, 122, 135, 136, 142, and 143 be reconsidered and withdrawn.

3.2 Claims 106, 107, 122, 141-143, and 150 have been rejected as obvious under 35 U.S.C. § 103(a) over Jacobson I.

Claims 106, 107, 122, and 141 depend from amended claim 102. As detailed in section 2.2, Jacobson I does not teach or suggest all the limitations recited in amended claim 102. Accordingly, rejections of claims 106, 107, 122, and 141 under 103(a) cannot be sustained.

Amended claim 142, as detailed in section 3.1, recites that the claimed electrophoretic element has a ratio between about 1:2 and about 1:20 for a mass of the binder solid to a mass of

the capsules. Jacobson I does not mention the above ratio in its disclosure, nor does it suggest any advantage for having the ratio as recited in amended claim 142. Accordingly, at least one limitation recited in amended claim 142 is not taught or suggested by Jacobson I, and a rejection of amended claim 142 under 35 U.S.C. § 103 over Jacobson I cannot be sustained.

Amended claim 143, as detailed in section 3.1, recites that at least a portion of the claimed electrophoretic element has an optically active fraction of at least 70%. Jacobson I does not mention optically active fractions in its disclosure, nor does it suggest any advantage for having the optically active fraction as recited in amended claim 143. Accordingly, at least one limitation recited in amended claim 143 is not taught or suggested by Jacobson I, and rejections of amended claim 143 and its dependent claims 148, 149, 152-160, and 162-166 (see section 2.2) under 35 U.S.C. § 103 over Jacobson I cannot be sustained. Claim 150 has been amended to depend from amended claim 143, therefore, the § 103 rejection of amended claim 150 cannot be sustained either.

Accordingly, Applicants respectfully request that the § 103 rejections based on Jacobson I against claims 106, 107, 122, 141-143, and 150 be reconsidered and withdrawn.

3.3 Claims 128-131 have been rejected as obvious under 35 U.S.C. § 103(a) over Jacobson I in view of Turner.

Claims 128-131 depend from amended claim 102. As detailed in section 2.2, Jacobson I at least does not teach or suggest that at least one of the capsules in its electrophoretic element is enclosed by a deformable membrane deformed into a non-spherical shape, a limitation expressly recited in amended claim 102.

Turner describes fabricating a nonemissive and electronically addressable display using non-vacuum deposition processes (col. 2, lns. 29-52). Turner does not teach or suggest having non-spherical capsules in its displays. Therefore, Turner does not cure Jacobson I's deficiency with regard to amended claim 102, and the rejection of amended claim 102 under 35 U.S.C. § 103 over Jacobson I and Turner cannot be sustained. Accordingly, Applicants respectfully

request that the § 103 rejections based on Jacobson I in view of Turner against claims 128-131 be reconsidered and withdrawn.

3.4 Claims 121 and 161 have been rejected as obvious under 35 U.S.C. § 103(a) over Jacobson I in view of Jacobson II.

Claim 121 depends from amended claim 102. As detailed in section 2.2, Jacobson I at least does not teach or suggest that at least one of the capsules in its electrophoretic element is enclosed by a deformable membrane deformed into a non-spherical shape, a limitation expressly recited in amended claim 102.

Claim 161 has been amended to depend from amended claim 143. As detailed in section 3.2, Jacobson I does not teach or suggest all the limitations recited in amended claim 143.

The additional reference, Jacobson II, does not qualify as prior art to the present application any more. Specifically, Applicants note that Jacobson II could only qualify as prior art under 35 U.S.C. § 102(e). However, Jacobson II is disqualified as prior art under 35 U.S.C. § 103(c) as the present application is filed as a CPA under 37 CFR 1.53(d) after November 29, 1999. See, MPEP 706.02(l)(1). The subject matter of Jacobson II and the claimed invention of the present application were, at the time the invention was made, owned by E Ink Corporation or subject to an obligation of assignment to E Ink Corporation. Common ownership by E Ink Corporation of the present application and Jacobson II for purposes of 35 U.S.C. § 103(c) is established by: (1) an assignment recorded at Reel 010576, Frame 0560, the assignment dated no later than January 24, 2000, that conveys the entire rights in the instant application to E Ink Corporation; (2) an assignment recorded at Reel 10750, Frame 0857, the assignment dated no later than June 22, 2000, that conveys the entire rights in Jacobson II (U.S. Patent No. 6,323,989) to E Ink Corporation. Accordingly, Applicants respectfully request disqualification of Jacobson II as prior art to the present application for purposes of rejections based on 35 U.S.C. 103(a).

Accordingly, Applicants respectfully request the reconsideration and withdrawal of the rejections of claims 121 and 161 as obvious in view of Jacobson I and Jacobson II.

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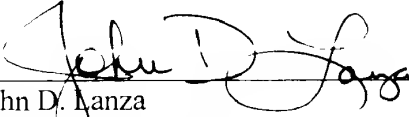
SUMMARY

Upon entry of the present Amendment, claims 102-144 and 148-166 are pending and presented for consideration. Applicants respectfully submit that no new matter is introduced by the present Amendment.

Respectfully submitted,

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